

1. Work requester fills out this section.

☐ Standing Work Permit

Requester: P. Kroon	Date: 10/28/03	Ext.: 5114	Dept/Div/Group: PO/PHENIX
Other Contact person (if different from requester): Sal Marino		Ext.: 3704	
Work Control Coordinator: C. Pearson	Start Date: ~11/4/03	Est. End Date: Same day	
Brief Description of Work: Install aerogel detector in sector 1 of west carriage per attached instructions.			
Building: 1008	Room: IR	Equipment:	Service Provider: PHENIX

2. WCC, Requester/Designee, Service Provider, and ES&H (as necessary) fill out this section or attach analysis

**ES&H ANALYSIS**

<b>Radiation Concerns</b>	<input checked="" type="checkbox"/> None	<input type="checkbox"/> Activation	<input type="checkbox"/> Airborne	<input type="checkbox"/> Contamination	<input type="checkbox"/> Radiation	<input type="checkbox"/> Other
<input type="checkbox"/> Special nuclear materials involved, notify Isotope Special Materials Group			<input type="checkbox"/> Fissionable materials involved, notify Laboratory Criticality Officer			
<b>Safety Concerns</b>	<input type="checkbox"/> None	<input type="checkbox"/> Ergonomics	<input type="checkbox"/> Transport of Haz/Rad Material			
<input type="checkbox"/> Adding/Removing Walls or Roofs	<input type="checkbox"/> Confined Space*	<input type="checkbox"/> Explosives	<input type="checkbox"/> Lead*	<input type="checkbox"/> Penetrating Fire Walls		
<input type="checkbox"/> Asbestos*	<input type="checkbox"/> Corrosive	<input type="checkbox"/> Flammable	<input type="checkbox"/> Magnetic Field*	<input type="checkbox"/> Pressurized Systems		
<input type="checkbox"/> Beryllium*	<input type="checkbox"/> Cryogenic	<input type="checkbox"/> Fumes/Mist/Dust*	<input type="checkbox"/> Material Handling	<input type="checkbox"/> Rigging/Critical Lift		
<input type="checkbox"/> Biohazard*	<input type="checkbox"/> Electrical	<input type="checkbox"/> Heat/Cold Stress	<input type="checkbox"/> Noise*	<input type="checkbox"/> Toxic Materials*		
<input type="checkbox"/> Chemicals*	<input checked="" type="checkbox"/> Elevated Work*	<input type="checkbox"/> Hydraulic	<input type="checkbox"/> Non-ionizing Radiation*	<input type="checkbox"/> Vacuum		
	<input type="checkbox"/> Excavation	<input type="checkbox"/> Lasers*	<input type="checkbox"/> Oxygen Deficiency*	<input type="checkbox"/> Other		

\* Does this work require medical clearance or surveillance from the Occupational Medicine Clinic? ☐ Yes ☒ No

**Environmental Concerns**

<input type="checkbox"/> Atmospheric Discharges (rad/non-rad)	<input checked="" type="checkbox"/> None	<input type="checkbox"/> Work impacts Environmental Permit No.
<input type="checkbox"/> Chemical or Rad Material Storage or Use	<input type="checkbox"/> Land Use	<input type="checkbox"/> Soil activation/contamination
<input type="checkbox"/> Cesspools (UIC)	<input type="checkbox"/> Liquid Discharges	<input type="checkbox"/> Waste-Clean
<input type="checkbox"/> High water/power consumption	<input type="checkbox"/> Oil/PCB Management	<input type="checkbox"/> Waste-Hazardous
	<input type="checkbox"/> Spill potential	<input type="checkbox"/> Waste-Industrial
Waste disposition by:		<input type="checkbox"/> Waste-Mixed
		<input type="checkbox"/> Waste-Radioactive
		<input type="checkbox"/> Waste-Regulated Medical
		<input type="checkbox"/> Underground Duct/Piping
		<input type="checkbox"/> Other

Pollution Prevention (P2)/Waste Minimization Opportunity: ☒ None ☐ Yes

**FACILITY CONCERNS**

<input checked="" type="checkbox"/> None	<input type="checkbox"/> Access/Egress Limitations	<input type="checkbox"/> Electrical Noise	<input type="checkbox"/> Potential to Cause a False Alarm	<input type="checkbox"/> Vibrations
	<input type="checkbox"/> Impacts Facility Use Agreement	<input type="checkbox"/> Temperature Change	<input type="checkbox"/> Other	
	<input type="checkbox"/> Configuration Control	<input type="checkbox"/> Maintenance Work on Ventilation Systems	<input type="checkbox"/> Utility Interruptions	

**WORK CONTROLS**

**Work Practices**

<input checked="" type="checkbox"/> None	<input type="checkbox"/> Exhaust Ventilation	<input type="checkbox"/> Lockout/Tagout	<input type="checkbox"/> Spill Containment	<input type="checkbox"/> Security (see Instruction Sheet)
<input type="checkbox"/> Back-up Person/Watch	<input type="checkbox"/> HP Coverage	<input type="checkbox"/> Posting/Warning Signs	<input type="checkbox"/> Time Limitation	<input type="checkbox"/> Other
<input type="checkbox"/> Barricades	<input type="checkbox"/> IH Survey	<input type="checkbox"/> Scaffolding-requires inspection	<input type="checkbox"/> Warning Alarm (i.e. "high level")	

**Protective Equipment**

<input type="checkbox"/> None	<input type="checkbox"/> Ear Plugs	<input type="checkbox"/> Gloves	<input type="checkbox"/> Lab Coat	<input type="checkbox"/> Safety Glasses
<input type="checkbox"/> Coveralls	<input type="checkbox"/> Ear Muffs	<input type="checkbox"/> Goggles	<input type="checkbox"/> Respirator	<input type="checkbox"/> Safety Harness
<input type="checkbox"/> Disposable Clothing	<input type="checkbox"/> Face Shield	<input checked="" type="checkbox"/> Hard Hat	<input type="checkbox"/> Shoe Covers	<input type="checkbox"/> Safety Shoes
				<input type="checkbox"/> Other

**Permits Required (Permits must be valid when job is scheduled.)**

<input checked="" type="checkbox"/> None	<input type="checkbox"/> Cutting/Welding	<input type="checkbox"/> Impair Fire Protection Systems
<input type="checkbox"/> Concrete/Masonry Penetration	<input type="checkbox"/> Digging/Core Drilling	<input type="checkbox"/> Rad Work Permit-RWP No
<input type="checkbox"/> Confined Space Entry	<input type="checkbox"/> Electrical Working Hot	<input type="checkbox"/> Other

**Dosimetry/Monitoring**

<input checked="" type="checkbox"/> None	<input type="checkbox"/> Heat Stress Monitor	<input type="checkbox"/> Real Time Monitor	<input type="checkbox"/> TLD
<input type="checkbox"/> Air Effluent	<input type="checkbox"/> Noise Survey/Dosimeter	<input type="checkbox"/> Self-reading Pencil Dosimeter	<input type="checkbox"/> Waste Characterization
<input type="checkbox"/> Ground Water	<input type="checkbox"/> O <sub>2</sub> /Combustible Gas	<input type="checkbox"/> Self-reading Digital Dosimeter	<input type="checkbox"/> Other
<input type="checkbox"/> Liquid Effluent	<input type="checkbox"/> Passive Vapor Monitor	<input type="checkbox"/> Sorbent Tube/Filter Pump	

**Training Requirements (List below specific training requirements)**

Based on analysis above, the Walkdown Team determines the risk, complexity, and coordination ratings below:

<b>ES&amp;H Risk Level:</b>	<input checked="" type="checkbox"/> Low	<input type="checkbox"/> Moderate	<input type="checkbox"/> High
<b>Complexity Level:</b>	<input checked="" type="checkbox"/> Low	<input type="checkbox"/> Moderate	<input type="checkbox"/> High
<b>Work Coordination:</b>	<input checked="" type="checkbox"/> Low	<input type="checkbox"/> Moderate	<input type="checkbox"/> High

If using the permit when all hazard ratings are low, only the following need to sign: (Although allowed, there is no need to use back of form)

WCC: <i>C. Pearson</i>	Date: 10/30/03
Service Provider: <i>P. Kroon</i>	Date: 10/30/03
Authorization to start: <i>C. Pearson</i>	Date: 10/30/03
(Departmental Sup/WCC/Designee)	

**3. Both work requester and service provider contribute to work plan (use attachments for detailed plans)****Work Plan** (procedures, timing, equipment, and personnel availability need to be addressed):

Special Working Conditions Required:

Operational Limits Imposed:

Post Work Testing Required:

Job Safety Analysis Required: ☐ Yes ☐ NoWalkdown Required: ☐ Yes ☐ No**Reviewed by:** Primary Reviewer will determine the size of the review team and the other signatures required based on hazards and job complexity. Primary Reviewer signature means that the hazards and risks that could impact ES&H have been identified and will be controlled according to BNL requirements.

Title	Name (print)	Signature	Life #	Date
Primary Reviewer				
ES&H Professional				
Other				
Other				
Work Control Coordinator				
Service Provider				
Review Done: <input type="checkbox"/> in series <input type="checkbox"/> team				

**4. Job site personnel fill out this section.**

Note: Signature indicates personnel performing work have read and understand the hazards and permit requirements (including any attachments).

Job Supervisor:		Contractor Supervisor:	
Workers:	Life#:	Workers :	Life#:

Workers are encouraged to provide feedback on ES&amp;H concerns or on ideas for improved job work flow. Use feedback form or space below.

**5. Departmental Job Supervisor, Work Control Coordinator/Designee**

Conditions are appropriate to start work: (Permit has been reviewed, work controls are in place and site is ready for job.)

(9/2003)

Name:	Signature:	Life#:	Date:
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**6. Departmental Job Supervisor, Work Requester/Designee determines if Post Job Review is required.** ☐ Yes ☐ No

Post Job Review (Fill in names of reviewers)

Name:	Signature:	Life#:	Date:
Name:	Signature:	Life#:	Date:

**7. Worker provides feedback.**

Worker Feedback (use attached sheets as necessary)

a) WCM/WCC: Is any feedback required? ☐ Yes ☐ Nob) Workers: Are there better methods or safer ways to perform this job in the future? ☐ Yes ☐ No**8. Closeout: Work Control Coordinator (authorizing dept.) checks quality of completed permit and ensures the work site is left in an acceptable condition. (WCC can delegate clean up of work area to work supervisor)**

Name:	Signature:	Life#:	Date:
Comments:			

# **Aerogel Installation**

## **1. Purpose and Scope**

This document describes the method to safely handle and install the Aerogel detector onto the West Carriage using commercially available lifting equipment. The detector is built as two identical arrays weighing about 450 pounds each. This procedure can be reversed for removal of the detector arrays.

## **Summary**

In order to minimize the amount of structural (non-active-detector) material used, the aerogel detector array has been designed as a hanging assembly, which can not stand by itself on the floor. 80 aerogel detector boxes are assembled into an array structure hanging from a commercial gantry, which is used as an assembly frame. The array hangs by two commercial trolleys, which are integral parts of the array structure. The array is about 82 inches long, 14 inches wide and 54 inches high. Stops on the frame I-beam prevent the array from rolling during assembly and transportation. Cables and hoses will be routed to the outside end and tied up out of the way for installation.

The six-inch beam of the frame serves as the lifting beam to carry the array up to a transition beam mounted on the west carriage. The array is then rolled from the lift beam to the transition beam to the support beam mounted in sector 1 of the carriage. I-beam clamps rated at 1000 Lb. each are clamped to the top of the gantry beam directly above the trolleys to provide lift points for the array/beam assembly.

Figures 1 and 2 illustrate the above summary.

## **2. Responsibilities**

Only trained BNL technicians shall perform the tasks described herein, under the supervision of the PHENIX Building 1008 Lead Technician.

## **3. Prerequisites**

- 3.1. The support beam and I-beam extension must be in place on the west carriage, leveled and aligned to receive the aerogel array. The support beam must have a temporary trolley stop in place on its extreme north end as extra insurance against overshoot during the array installation.
- 3.2. The array on its frame will have been rolled into the PHENIX IR to within crane reach, with beam clips and shackles in place.

- 3.3. The array will have been located such that the lift beam is level when suspended from crane.
- 3.4. The West carriage must be in its retracted position (closest to west wall).
- 3.5. All personnel performing tasks described herein shall possess a current BNL Safety Awareness Certificate (SAC).
- 3.6. All personnel performing tasks described herein shall possess a current training certifications for the equipment used, per BNL ES&H standard 1.6.0.
- 3.7. All personnel performing tasks described herein shall wear proper personal protective equipment, per BNL ES&H standard 1.16.0.
- 3.8. All materials handling equipment shall have been maintained and inspected per BNL ES&H standard 1.6.0.
- 3.9. Only personnel actually involved with the handling or installation process shall be permitted in the work area.
- 3.10. The handrails will have been removed from the south upper west rack platforms and the area taped off.

#### **4. Precautions**

- 4.1 Avoid lifting detector over unprotected sections of beam pipe.
- 4.2 Check that the entire path through the IR is clear.
- 4.3. Identify north and south ends of detector per assembly drawing. (Also marked on frame I-beam)
- 4.4. Check to ensure that trolley stops are firmly in place on the lift beam.
- 4.5. Ensure that the retaining strap has been installed on the pre-amp end of the array.

## 5. Required equipment

Two slings, rated 1 ton min., 4 ft. long min.

Two 1/2 inch shackles, rated 1 ton min.

PHENIX IR (Bldg. 1008) Crane (12 ton) with 2 auxiliary hoists (1 ton each).

Two tag lines.

## 6. Procedure

6.1. Using the two shackles and slings, and the 12-ton crane, lift the frame/array assembly just enough to get all the weight on the crane.

6.2. Carefully remove support legs from frame, and put them aside.

6.3. Attach tag lines to the array and orient the array east-west.

6.4. Lift the array and move it to the south end of the west carriage and align the north end of the lift beam with the transition beam on the carriage.

6.5. Use the splice plate to firmly clamp the lift beam to the I-beam extension, and adjust crane to level the lift beam.

6.6. Remove trolley stops as required to allow array to roll north, and slowly roll the array onto the support beam and locate it on the north end. Use restraining strap to bolt the array into position on the support beam.

6.7. Remove temporary trolley stop, lifting gear and I-beam extension assembly.

6.8. Use the jacking screws located on each end of the support beam to raise the array approximately 6 inches to its "final" position. Coordinate jacking to keep beam reasonably level during this operation. Check and adjust for level when through.

## 7. References

- 7.1. Aerogel Detector Frame Assembly drawing 105-0215-037 (2 sheets)
- 7.2. Aerogel Detector I-Beam Extension Assembly drawing 105-0215-038

## 8. Figures

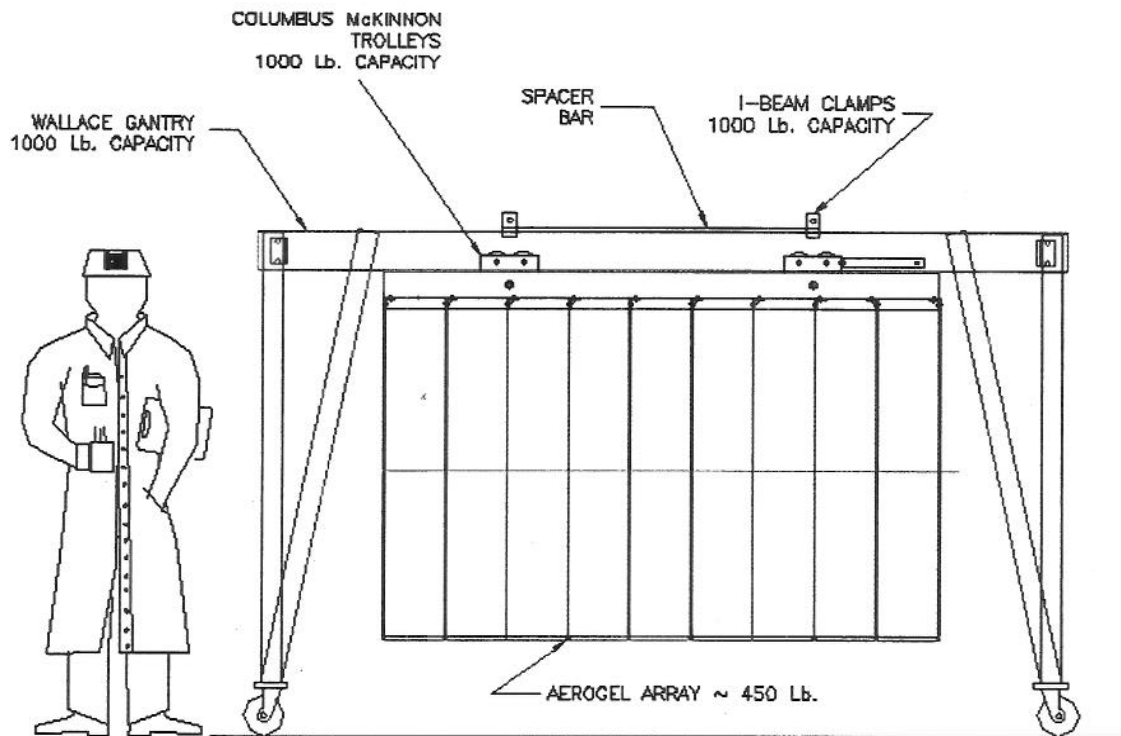


FIGURE 1 ARRAY ASSEMBLED ON GANTRY



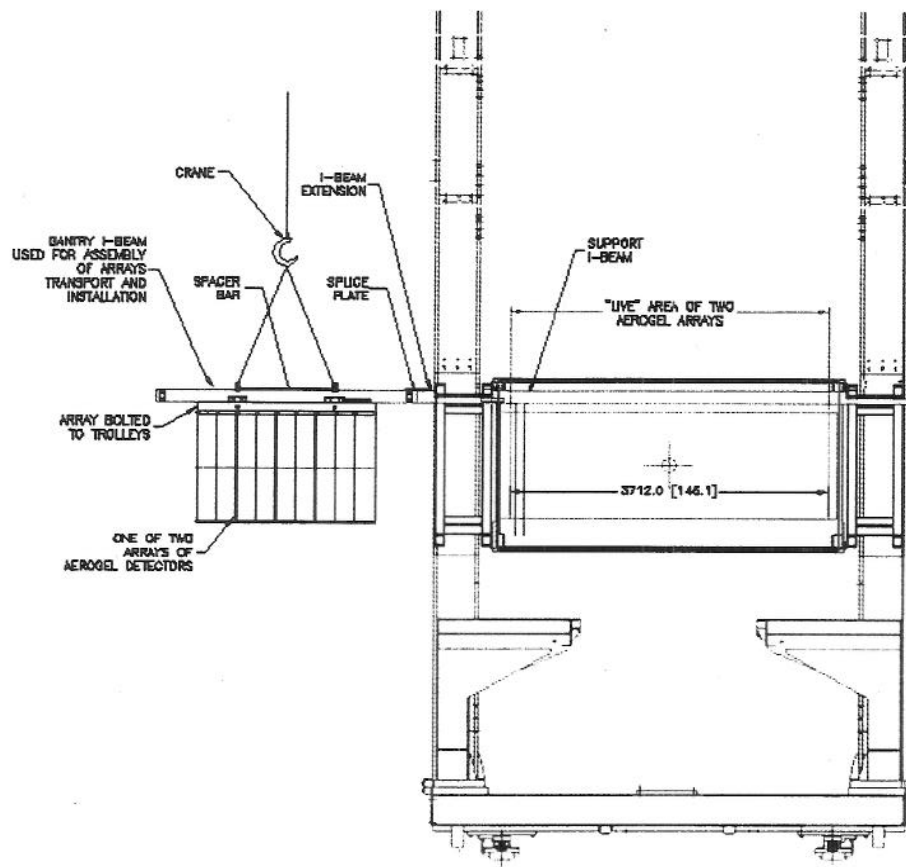


FIGURE 2. Installing Aerogel Array in West Carriage